Building Commissioning - Overview

What is Commissioning?

Building commissioning (Cx) is a systematic process of assuring that a building performs in accordance with the design intent and the owner's operational needs. Incorporating commissioning into a project can help maximize building performance and energy efficiency and avoid pitfalls common to the design and construction process.

Commissioning Process

Building commissioning begins, ideally, in the initial design stages of a project, continues through construction, and is the key to final acceptance of a newly constructed building. The Cx process involves several steps:

- Define the Owner's requirements for the project.

Assign a Commissioning Team with a designated Commissioning Authority that is independent of the design/build teams to oversee and administer the commissioning process.

- Develop a Commissioning Plan that defines the Cx process and evolves with increasing detail as the project progresses.
- Integrate Cx requirements into construction documents so that the contracting bids may properly reflect the cost. This will define the intent of each system and include the Cx requirements for installation of these systems.
- Issue a Final Commissioning Plan, which defines static tests, start-up procedures, component and subsystem tests, as well as functional performance test procedures (detailed step-by-step procedures) for each piece of equipment as well the overall systems installed.
- Test the functional performance of the project. Executing the test procedures and checklists in the Final Commissioning Plan will verify proper operations.
- Complete a Final Commissioning Report, which is a comprehensive report documenting the commissioning activities conducted, and any issues that were discovered and resolved.
- Create Operational & Maintenance manuals.
- Create a Re-commissioning Management manual.
- Train the staff and operators.
- Accept the project!

Benefits of Commissioning

The commissioning process detects problems and identifies solutions through every step of design and construction. It is able to prevent problems by ensuring that building systems are properly integrated and operated. Having the building's systems begin at their optimal productivity level will improve the likelihood that the systems will sustain this level of performance throughout their life span. While energy efficiency and the resulting reduction in cost is the most often mentioned benefit of building commissioning there are many other advantages such as:

- Improved performance of building systems and equipment;
- Improved indoor air quality;
- Improved occupant comfort and productivity;
- Reduced equipment warranty issues; and
- Reduced operation and maintenance cost.

Commissioning Cost

In general, the cost of commissioning is less than the cost of not commissioning. The energy, water, productivity, and operational savings typically outweigh the initial cost of commissioning. From a 2004 national survey and analysis of 224 commercial buildings, Lawrence Berkeley National Laboratory determined that median commissioning costs for new construction are $1.00/ft^2 (0.6 percent of total construction costs), yielding a median payback time of 4.8 years.

Commissioning Scope	Cost
Entire Building (HVAC, Controls, Electrical, Mechanical)	0.5%-1.5% of total construction cost
HVAC and Automated Control System	1.5%-2.5% of mechanical system cost
Electrical Systems	1.0%-1.5% of electrical system cost

**Source: DOE, Building Toolbox, Building Commissioning*

Resources for more information

- Rebuild Colorado - http://www.colorado.gov/rebuildco/services/highperformance/index.htm
- DOE (U.S. Dept. Of Energy) – www.eere.energy.gov/buildings/info/operate/buildingcommissioning.html